Socio-economic Status (SES), Poverty, and Income Inequality

How do these concepts relate to the health of populations?
<table>
<thead>
<tr>
<th>Upstream</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment (real and perceived)</td>
<td>Individual</td>
</tr>
<tr>
<td>Macro</td>
<td>Mezzo</td>
</tr>
<tr>
<td>Culture</td>
<td>Social networks structure</td>
</tr>
<tr>
<td>Socio-economic factors</td>
<td>Characteristics of network ties</td>
</tr>
<tr>
<td>Political structure and policies</td>
<td>Social capital</td>
</tr>
<tr>
<td>Gender and Race</td>
<td>Access to resources</td>
</tr>
<tr>
<td>Media</td>
<td>Communication about health and social conditions (cultural &amp; scientific knowledge, education, entertainment, interpersonal interaction)</td>
</tr>
<tr>
<td>Lifespan development</td>
<td>Theories of interpersonal influences on health behavior</td>
</tr>
</tbody>
</table>
Class Objectives

• Develop an understanding of key concepts including socio-economic status (SES) and income inequality

• Become familiar with key measurements:
  – Poverty level
  – Gini coefficient

• Examine data linking SES and income inequality to health status
Major theorists

• Emile Durkheim
  – “The Division of Labor in Society”
  – Reflects higher levels of complexity, functionality for the society

• Karl Marx
  – Relationship to means of production
  – Two key classes – owners, workers
  – Focus on issues of power, control, ownership
Major theorists

Max Weber

– Multiple axes
  • Class (economic)
    – Defined by economic “life-chances”: what can you do or hope for
    – Stratified according to relations to production and acquisition of goods
  • Status (social)
    – Amorphous communities tied by “honor”
    – Stratified according to principles of consumption of goods as represented by “styles of life”
  • “Party” (political/power)
    – May be ephemeral or enduring
    – Defined by ability to organize communally towards a given goal
## Pierre Bourdieu’s socio-cultural strata

<table>
<thead>
<tr>
<th>Economic capital</th>
<th>High cultural capital</th>
<th>Low cultural capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>High economic capital</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Low economic capital</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

- Economic capital (income, wealth)
- Cultural capital (accumulated knowledge of artistic and intellectual traditions of society)
Most commonly used in public health studies

1) Level of income or accrued wealth (15%)
2) Type of occupation (22%)
3) Level of education (45%)

Percents refer to share of studies in *American Journal of Epidemiology* from 1982-1985 using this variable as proxy for SES (Source: Kaplan and Keil 1993)
UK classification

Registrar General of GB occupational categories (based on Weber’s ideas about economic power and social class)

I. Professionals
   • E.g. doctors, lawyers, executives

II. Managerial and lower professionals
    • E.g. sales managers, teachers

III-N. Nonmanual skilled
    • (e.g. clerks, shop assistants)

III-M. Manual skilled
    • E.g. machinists

IV. Partly skilled
    • E.g. postal carriers

V. Unskilled
   • E.g. Laborers, porters
<table>
<thead>
<tr>
<th>Item/service</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color television</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Radio</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Toilet</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Automobile</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Household help paid monthly (or who work 5 or more days a week)</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Vacuum cleaner</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Washing machine</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>VCR or DVD player</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Freezer (separate or part of refrigerator)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Educational level of head of household</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate/didn’t finish primary school</td>
<td>0</td>
</tr>
<tr>
<td>Finish primary, some high school</td>
<td>1</td>
</tr>
<tr>
<td>High school graduate/some college</td>
<td>2</td>
</tr>
<tr>
<td>College graduate/some graduate</td>
<td>3</td>
</tr>
<tr>
<td>Completed graduate education</td>
<td>5</td>
</tr>
</tbody>
</table>

Brazilian Economic Classification Criteria (from www.abep.org)
Brazilian SES saying?!

- (Response to someone slamming the door of a car)
  - Puxa vida. Você não tem geladeira em casa, não? Seja mais educada.
  - “How crude (??). You must not have a refrigerator in your house. Try to be more educated.”

Relationship of “poverty” and health

- One of the most persistent findings in all of social epidemiology
  - Across conditions
  - Across genders
  - Across societies
  - See relationship in both subjective ratings of health status (poor more likely to rate their health as poor) but also in objective measures based on lab tests or physical examinations
  - Can’t be fully explained by medical care or behavioral risk
Percentage of UK men with limiting long-term illness, by age and socioeconomic classification, 2007

Life Expectancy and Disability-Free Expectancy (DFLE) at Birth, Persons by Neighborhood Income Level, England, 1999-2003

Adapted by CTLT from Office for National Statistics.
UK life expectancy versus occupational class

Fig. 1. Occupational class differences in life expectancy, England and Wales, 1997–1999

U.S. Mortality vs education

Figure 26. Death rates for selected causes for adults 25–64 years of age, by education level, and sex: selected states, 1995

Deaths per 100,000 population

<table>
<thead>
<tr>
<th>Cause</th>
<th>Education</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic diseases</td>
<td>Less than 12 years</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>Chronic diseases</td>
<td>12 years</td>
<td>400</td>
<td>90</td>
</tr>
<tr>
<td>Chronic diseases</td>
<td>13 or more years</td>
<td>300</td>
<td>80</td>
</tr>
<tr>
<td>Injuries</td>
<td>Less than 12 years</td>
<td>200</td>
<td>40</td>
</tr>
<tr>
<td>Injuries</td>
<td>12 years</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>Injuries</td>
<td>13 or more years</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Communicable diseases</td>
<td>Less than 12 years</td>
<td>150</td>
<td>30</td>
</tr>
<tr>
<td>Communicable diseases</td>
<td>12 years</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>Communicable diseases</td>
<td>13 or more years</td>
<td>50</td>
<td>10</td>
</tr>
</tbody>
</table>

Age-standardized cardiovascular death rates at ages under 75 by local ward deprivation and gender, 1999 and 2001-3, UK.

Age-standardized cancer death rates at ages under 75 by local ward deprivation and gender, 1999 and 2001-3, UK.

Inequality in early cognitive development of children in the 1970 British Cohort Study, at ages 22 months to 10 years

Rates of poor social adjustment by father’s social class at birth and ages 7, 11, and 16, UK 1958 Child Development Study

Data source: 1958 National Child Development Study
Birth weight by socioeconomic status, 2003-4, UK

Percentage of children whose mother suffered postnatal depression, by socioeconomic status, 2003-4, UK

Percentage of 3-year-old children read to every day and with regular bed times, by socioeconomic status, 2003-4, UK

Percentage of children 10-14 exposed to movie violence

<table>
<thead>
<tr>
<th>Parent Education</th>
<th>N</th>
<th>Percent</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelors, graduate, or professional degree</td>
<td>1987</td>
<td>35.11</td>
<td>Reference</td>
</tr>
<tr>
<td>Some college, vocational/technical, or Associates degree</td>
<td>1904</td>
<td>53.53</td>
<td>1.81 (1.48-2.21)</td>
</tr>
<tr>
<td>High school graduate or less</td>
<td>2615</td>
<td>61.81</td>
<td>2.86 (2.34-3.49)</td>
</tr>
</tbody>
</table>

Adapted from Worth KA, et al. Pediatrics 2008;122:306-312
Development quotients of growth-retarded infants in stimulation/nutrition study, Jamaica. WHO, 2008
Definitions – absolute poverty

• Absolute poverty: cannot meet basic human needs for food, shelter, and disease avoidance.
• Usually measured financially, but lots of critiques – what is “required” depends a lot on job, family structure, etc. and on social norms.
• In US, is costs of a particular basket of food to meet a basic meal plan, adjusted for inflation and family size (“Orshansky threshold”).
• Recent adjustments to account for regional variation in housing and other expenses.
### Poverty Thresholds for 2004 by Size of Family and Number of Related Children Under 18 Years

<table>
<thead>
<tr>
<th>Size of family unit</th>
<th>Weighted average thresholds</th>
<th>None</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>One person (unrelated individual)...</td>
<td>9,645</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 65 years</td>
<td>9,827</td>
<td>9,827</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65 years and older</td>
<td>9,060</td>
<td>9,060</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two persons</td>
<td>12,334</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Householder under 65 years</td>
<td>12,714</td>
<td>12,649</td>
<td>13,020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Householder 65 years and older</td>
<td>11,430</td>
<td>11,418</td>
<td>12,971</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three persons</td>
<td>15,067</td>
<td>14,776</td>
<td>15,205</td>
<td>15,219</td>
<td></td>
</tr>
<tr>
<td>Four persons</td>
<td>19,307</td>
<td>19,484</td>
<td>19,803</td>
<td>19,157</td>
<td>19,223</td>
</tr>
<tr>
<td>Five persons</td>
<td>22,831</td>
<td>23,497</td>
<td>23,838</td>
<td>23,108</td>
<td>22,543</td>
</tr>
<tr>
<td>Six persons</td>
<td>25,788</td>
<td>27,025</td>
<td>27,133</td>
<td>26,573</td>
<td>26,037</td>
</tr>
<tr>
<td>Seven persons</td>
<td>29,236</td>
<td>31,096</td>
<td>31,290</td>
<td>30,621</td>
<td>30,154</td>
</tr>
<tr>
<td>Eight persons</td>
<td>32,641</td>
<td>34,778</td>
<td>35,086</td>
<td>34,454</td>
<td>33,901</td>
</tr>
<tr>
<td>Nine persons or more</td>
<td>39,048</td>
<td>41,836</td>
<td>42,039</td>
<td>41,480</td>
<td>41,010</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau.
Critique of Orshansky method

• Based on idea that about 33% of income spent on food
  – Relative cost of food, housing, energy, education, medical care have changed over time
  – Proportions vary around the country
  – Includes adjustments for many of above factors plus cash benefits


**MIS**: medical out-of-pocket subtracted from income  
**MIT**: medical out-of-pocket included in threshold  
**CMB** – combined the two above

<table>
<thead>
<tr>
<th>Alternative NAS-based method</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Official measure.</em></td>
<td>Number below poverty level</td>
<td>Poverty rate</td>
</tr>
<tr>
<td>No Geographic Adjustment of Thresholds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSI-NGA (Medical costs alternative 1)</td>
<td>34,790</td>
<td>12.4</td>
</tr>
<tr>
<td>MIT-NGA (Medical costs alternative 2)</td>
<td>36,001</td>
<td>12.8</td>
</tr>
<tr>
<td>CMB-NGA (Medical costs alternative 3)</td>
<td>36,597</td>
<td>13.0</td>
</tr>
<tr>
<td>Geographic Adjustment of Thresholds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSI-GA (Medical costs alternative 1)</td>
<td>34,694</td>
<td>12.3</td>
</tr>
<tr>
<td>MIT-GA (Medical costs alternative 2)</td>
<td>35,824</td>
<td>12.7</td>
</tr>
<tr>
<td>CMB-GA (Medical costs alternative 3)</td>
<td>36,442</td>
<td>12.9</td>
</tr>
</tbody>
</table>
Figure 3.
Number in Poverty and Poverty Rate: 1959 to 2004

Numbers in millions, rates in percent

Note: The data points are placed at the midpoints of the respective years.

Figure 4.
Poverty Rates by Age: 1959 to 2004

Note: The data points are placed at the midpoints of the respective years.
Data for people 18 to 64 and 65 and older are not available from 1960 to 1965.

Problems with absolute poverty

• Hard to determine an absolute threshold below which health is threatened, or an upper threshold over which there is a random distribution of health (or other “good” to be used as yardstick)

• Relationship of income to health gets weaker as income rises but does not go away
Problems with absolute poverty

• Across developed countries, higher GDP/capita (ecologic measure of personal income) is not related to health status

• Income and health can be related within but not necessarily among nations (though this is clearly not true for comparisons of developed with poor countries)
Relative poverty as a risk factor

- Where do people stand relative to others
- What is the degree of maldistribution of income
- Predicts that poor people will do worse in a society with a greater maldistribution of income as compared to one that is more egalitarian.
Gini coefficient

• 0=perfect equality (everyone has the same income
• 1=perfect inequality (one household has everything)
• Ratio of the area between the Lorenz curve and the perfect income distribution versus the entire area under the perfect distribution
• Developed by Corrado Gini (Italian economist and fascist theorist)
Lorenz Curve

Equality of distribution within selected nations, latest year available

* 0 = perfect equality; 1 = perfect inequality. Source: ADB. Adapted from *The Economist*, August 11, 2007.
Worsening maldistribution of income

• The income gap between those in the top 5% of US income distribution and those in the bottom 40% has been steadily increasing since in the early 1980s.
Source: ADB. Adapted from *The Economist*, August 11, 2007.
Relative poverty and health

• Among European countries, the percentage of overall wealth owned by the poorest 70% of the population is positively correlated with health status.

• In US, increase in Gini coefficient (0-1) of 0.1 corresponds to 46% increase in preventable deaths (Ronzio)
Relationship Between Relative Child Poverty and Under Age 5 Mortality in High-Income OECD Countries

![Graph showing the relationship between relative child poverty rate and mortality rate of children younger than 5 years, per 1,000.](image)

1Child living in household with income less than 50% of the national median; correlated with GINI coefficient

Adapted by CTLT from Emerson, E. JAMA 2009;301:425-426.
Proposed mechanisms relating absolute income to health

• Reduced sense of control over life events
  – At work and home

• Demand overload
  – Lack of resources to cope with demands
  – Increased “demands” in the form of less optimal environment

• Reduced social participation/less access to social resources
Proposed mechanisms linking relative income to health

- Feelings of relative deprivation lead to altered behavior and stress
- Erosion of collective social capital and trust lead to altered behavior/responsiveness to health messages
- Disinvestment in public goods as interests of the rich are seen to diverge from those of the poor

(Kim 2008)
Standardized job control scores as a function of employment grade

Corticotropin-Releasing Factor (CRF)
Acetylcholine (ACTH)
Cortisol (CORT)

Emotional stimulus
Sensory thalamus
Sensory cortex
Amygdala
Transitional cortex (perirhinal cortex, parahippocampal cortex, entorhinal cortex)
Hippocampus
Pituitary
PVN
Adrenal cortex

Emotional stimulus
CRF
Pituitary
ACTH
CORT
CORT
Adrenal cortex
“Social neuroscience”

• Epigenetics: environmental influences on gene expression

• Critical periods (?) for early nurturing that
  – Permanently (?) set level at which glucocorticoid receptor gene is expressed
    • Varies response to stress
  – Permanently (?) set level at which oxytocin receptor gene expressed
    • Varies nurturing and other affiliative behaviors
Social distinction

• Groups distinguish themselves through differential consumption
  – Partly economic but also symbolic (Bourdieu)
• Concept of “positional goods”
Impact of positional spending - 1

• Expenditure cascade: top earners spend more
  – Egg those below them to divert greater proportion of spending to positional goods
  – Drive up price of positional goods (neighborhood) that are gateway to non-positional goods (schools)
  – Force those lower on scale to adopt riskier positions to try to attain the same goods
Gas Grills Then and Now (Frank)

1989 Sunbeam, $90

Viking Professional, $5,000.
Impact of positional spending - 2

• Stress hypotheses
  – People happier if feel they are not behind
  – Leads to longer work hours because people value positional goods that cost money rather than rest or other intangibles

• Investment in positional goods reduces savings, insurance, investment in personal long-term welfare

• Investment in positional goods reduces investment in public welfare and in spending that mitigates inequality (police, emergency care, education, public transportation and recreation)
Personal Savings Rate Decrease

• Low savings is a serious problem
• Decline in savings rate has tracked increase in income inequality
Impact of positional spending - 3

• Reduced intergenerational mobility from lack of resources for children
  – What are the opportunities for subsequent generations to improve their SES (and thus their health)?
  – What resources for healthy development are universally provided?
  – What resources are dependent on family income?
Diffusion of “distinction”

• Upper SES takes on new bad habit
• Habit loses distinction as:
  – Learn more about risks
  – Have greater resources to tolerate/treat withdrawal
  – Mass marketing and copying make habit less distinctive
Diffusion of “distinction”

• Lower SES gets stuck with habit
  – Upper SES is making a profit
    • “Habit” is aggressively marketed
  – Lower SES has fewer resources to treat/tolerate withdrawal
  – Habit is “embedded” in group that has least social mobility
SES as determinant of social ties

• SES constrains social ties
  – Diverging values
  – Lack of resources that permit mobility
    • Poor public transit
    • Lack of public education

• Deliberate segregation
Geographic Distance
Colored Bars are Successive Waves of Observation

Relative increase in probability that ego will smoke if alter smokes (%)

Geographic distance between the ego and alter (mileage group)

Adapted by CTLT from Christakis NEJM 2008; 358:2249.

Christakis NEJM 2008;358:2249 [Colored bars are successive waves of observation]
Social Distance
Colored Bars are Successive Waves of Observation

Adapted by CTLT from Christakis NEJM 2008; 358:2249.

Christakis NEJM 2008;358:2249 [Colored bars are successive waves of observation]
Coming up

• Lab session
  – Whitehall II data on control and CHD and gender

• Next two classes
  – Social networks
  – Social support
  – Social capital